TORK®
valve & automation
high quality

PNEUMATIC ACTUATORS
USER MANUAL

SMS®

SMS SANAYİ MALZEMELERİ ÜRETİM VE SATIŞI A.Ş.

Read the instructions before use!

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1. GENERAL DESCRIPTION OF THE EQUIPMENT

a. Intended Use Of The Equipment

TORK Pneumatic Actuators are powerful, reliable and compact double rack pinion units for use with ball, butterfly and plug valves and any device requiring accurate fast or slow or proportional 90 ° turn motion. TORK Pneumatic Actuators are manufactured 7 different sizes both double acting and single acting spring return type. Besides standard manufacturing program, optionally pneumatic actuators can be manufactured with ± %10 stroke adjustable, 180° turn and 3- position types (open, half open, closed).

Any power operated device used to operate a valve. The device is designed to operate using motive energy which may be electrical, pneumatic, hydraulic, etc., or a combination of these. Movement is limited by travel, torque or thrust

Pneumatic Actuator is an automatic control device which open and close the rotating valves with the help of compressed air.

Pneumatic Actuators can be separated into two general groups: 1- Spring Return Actuators. 2- Double Acting Actuators. In Spring Return Actuators (Fig 1) the opening operation is done by pressurized air and the closing is done by springs. In Double Acting Actuators (Fig 2) opening and closing operations both are done by pressurized air.

Pneumatic actuators are using in different piping systems to open or close the valves. This equipment also related to the fluids, flow in the pipes can be used in explosive regions(ZONE I).

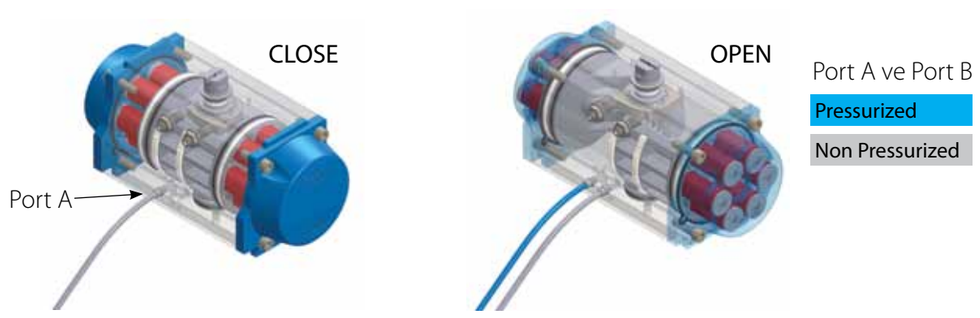

Fig 1 Spring Return Actuators

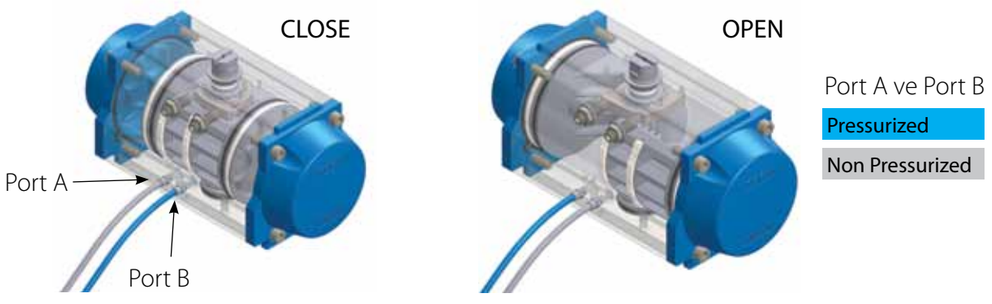

Fig 2 Double Acting Actuators

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RA
SERIES

b. Product Coding System

RA040.SR.09.036.000

EXTERNAL FLANGE CONNECTION

SINGLE FLANGE	000
Ø50	050
Ø70	070
Ø102	102
Ø140	140

INTERNAL FLANGE CONNECTION

Ø36	036
Ø42	042
Ø50	050
Ø70	070
Ø102	102
Ø125	125
Ø140	140
Ø165	165

SQUARE HEAD DIMENSION

09	17	36
11	22	
14	27	

TYPE

SR	SPRING RETURN
SY	SCOTCH YORK
DA	DOUBLE ACTING
3P	3 POSITION
8D	180° TURN
2D	120° TURN
8P	180° 3 POSITION

BODY DIMENSION

032	080	143	350
040	100	160	400
060	120	200	

SPECIFICATION

RA	STANDARD
RX	EXPROOF

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c. Exploded Drawings and Part Lists

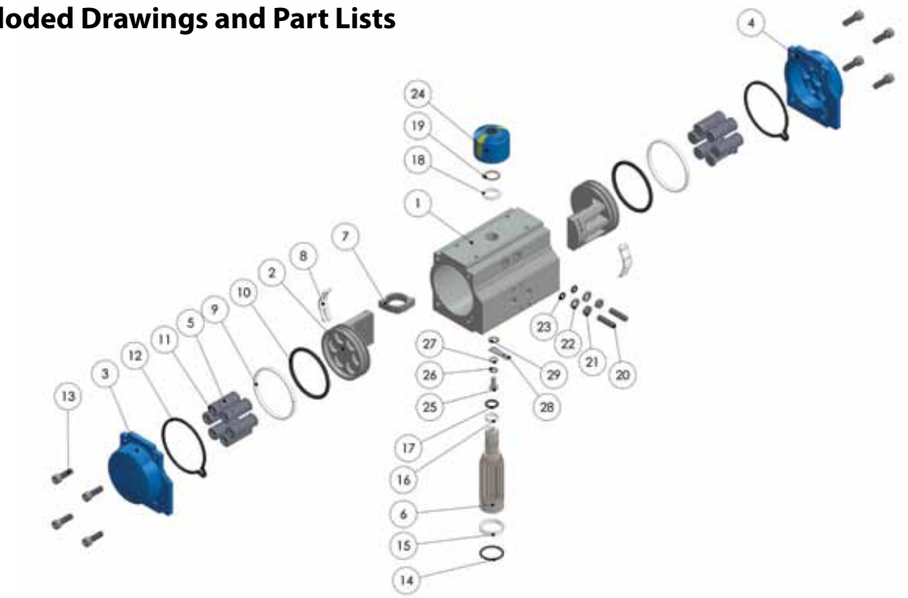

Fig 3 Exploded drawing of Spring Return Actuators(RA032-RA040-RA060-RA080-RA100-RA120)

29	SERRATED LOCK WASHER DIN 6798 M5	STAINLESS STEEL	NOS	1
28	GROUND CONNECTOR	BRASS	NOS	1
27	WASHER DIN 125 M5	STAINLESS STEEL	NOS	1
26	SPRING WASHER DIN 6799 M5	STAINLESS STEEL	NOS	1
25	BOLT DIN 7985 M5X16	STAINLESS STEEL	NOS	1
24	INDICATOR	ABS	NOS	1
23	O-RING (STOP SET SCREW)	NITRILE (NBR 70)	NOS	2
22	STOP SET SCREW WASHER DIN 125 M6	STAINLESS STEEL	NOS	2
21	STOP NUT DIN 934 M6	STAINLESS STEEL	NOS	2
20	STOP SET SCREW DIN 916 M6X25	STAINLESS STEEL	NOS	2
19	SPRING CLIP (PINION) DIN 471/15	STEEL ALLOY	NOS	1
18	THRUST BEARING (PINION)	POLYPHTALAMIDE	NOS	1
17	O-RING (PINION TOP)	NITRILE (NBR 70)	NOS	1
16	BEARING (PINION TOP)	POLYPHTALAMIDE	NOS	1
15	BEARING (PINION BOTTOM)	POLYPHTALAMIDE	NOS	1
14	O-RING (PINION BOTTOM)	NITRILE (NBR 70)	NOS	1
13	COVER BOLT DIN 912 M5X16	STAINLESS STELL	NOS	8
12	O-RİNG (COVER)	NITRILE (NBR 70)	NOS	2
11	SPRING HOLDER	POLYPROPLYLENE + GF	NOS	min.5/max.12
10	O-RING (PISTON)	NITRILE (NBR 70)	NOS	2
9	BEARING (PISTON SLIDING)	POLYPHTALAMIDE	NOS	2
8	BEARING (PISTON BACK)	POLYPHTALAMIDE	NOS	2
7	CAM (STOP ARRANGEMENT)	STAINLESS STELL	NOS	1
6	PINION	STEEL ALLOY	NOS	1
5	SPRING	HIGH ALLOY SPRING STEEL	NOS	min.5/max.12
4	COVER RIGHT	DIE CAST ALUMINIUM	NOS	1
3	COVER LEFT	DIE CAST ALUMINIUM	NOS	1
2	PISTON	DIE CAST ALUMINIUM	NOS	2
1	BODY	EXTRUDED ALUMINIUM ALLOY	NOS	1
No	**Part Name**	**Material**	**Unit**	**Quantity**

Tab 1 Part list of Spring Return Actuators(RA032-RA040-RA060-RA080-RA100-RA120)

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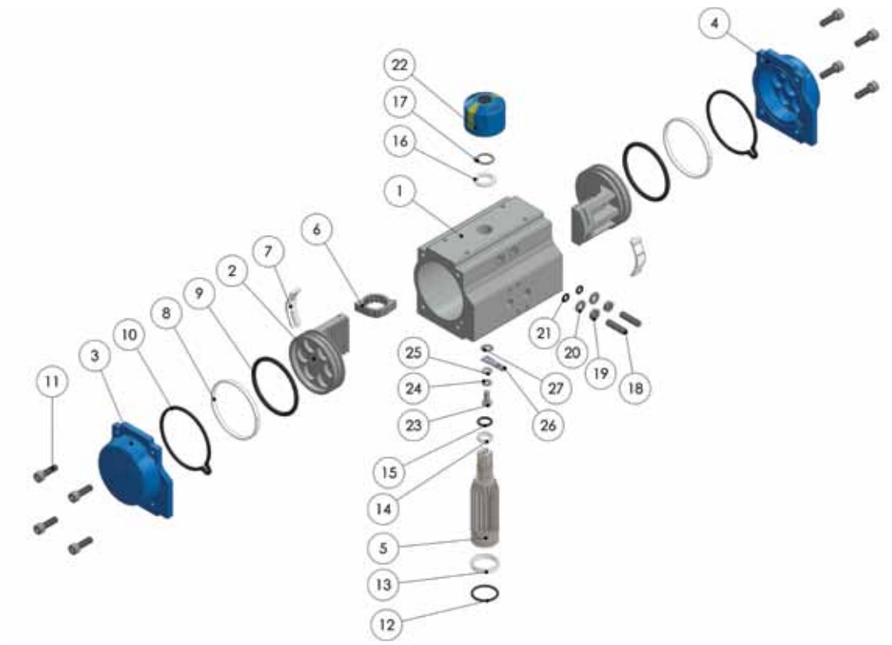

Fig 4 Exploded drawing of Double Acting Actuators (RA032-RA040-RA060-RA080-RA100-RA120)

27	SERRATED LOCK WASHER DIN 6798 M5	STAINLESS STEEL	NOS	1
26	GROUND CONNECTOR	BRASS	NOS	1
25	WASHER DIN 125 M5	STAINLESS STEEL	NOS	1
24	SPRING WASHER DIN 6799 M5	STAINLESS STEEL	NOS	1
23	BOLT DIN 7985 M5X16	STAINLESS STEEL	NOS	1
22	INDICATOR	ABS	NOS	1
21	O-RING (STOP SET SCREW)	NITRILE (NBR 70)	NOS	2
20	STOP SET SCREW WASHER DIN 125 M6	STAINLESS STEEL	NOS	2
19	STOP NUT DIN 934 M6	STAINLESS STEEL	NOS	2
18	STOP SET SCREW	STAINLESS STEEL	NOS	2
17	SPRING CLIP (PINION) DIN 471/15	STEEL ALLOY	NOS	1
16	THRUST BEARING (PINION)	POLYPHTALAMIDE	NOS	1
15	O-RING (PINION TOP)	NITRILE (NBR 70)	NOS	1
14	BEARING (PINION TOP)	POLYPHTALAMIDE	NOS	1
13	BEARING (PINION BOTTOM)	POLYPHTALAMIDE	NOS	1
12	O-RING (PINION BOTTOM)	NITRILE (NBR 70)	NOS	1
11	COVER BOLT DIN 912 M5X16	STAINLESS STELL	NOS	8
10	O-RİNG (COVER)	NITRILE (NBR 70)	NOS	2
9	O-RING (PISTON)	NITRILE (NBR 70)	NOS	2
8	BEARING (PISTON SLIDING)	POLYPHTALAMIDE	NOS	2
7	BEARING (PISTON BACK)	POLYPHTALAMIDE	NOS	2
6	CAM (STOP ARRANGEMENT)	STAINLESS STELL	NOS	1
5	PINION	STEEL ALLOY	NOS	1
4	COVER RIGHT	DIE CAST ALUMINIUM	NOS	1
3	COVER LEFT	DIE CAST ALUMINIUM	NOS	1
2	PISTON	DIE CAST ALUMINIUM	NOS	2
1	BODY	EXTRUDED ALUMINIUM ALLOY	NOS	1
No	**Part Name**	**Material**	**Unit**	**Quantity**

Tab 2 Part list of Double Acting Actuators (RA032-RA040-RA060-RA080-RA100-RA120)

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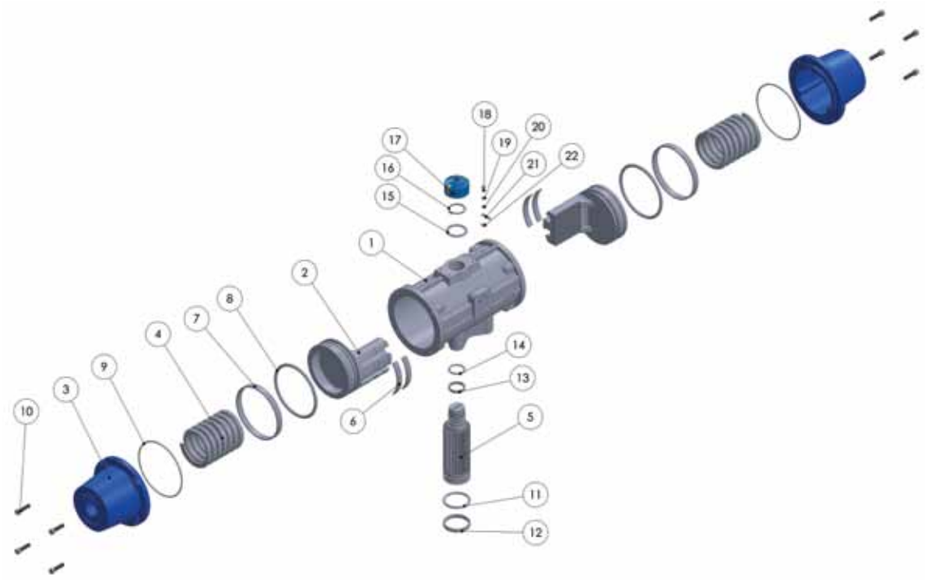

Fig 5 Exploded drawing of Spring Return Actuators (RA143-RA160-RA200-RA400)

No	Part Name	Material	Unit	Quantity
22	SERRATED LOCK WASHER DIN 6798 M5	STAINLESS STEEL	Adet	1
21	GRAUND CONNECTOR	BRASS	Adet	1
20	WASHER DIN 125 M5	STAINLESS STEEL	Adet	1
19	SPRING WASHER DIN 6799 M5	STAINLESS STEEL	Adet	1
18	BOLT DIN 7985 M5X16	STAINLESS STEEL	Adet	1
17	INDICATOR	ABS	Adet	1
16	SPRING CLIP (PINION) DIN 471/38	STEEL ALLOY	Adet	1
15	THRUST BEARING (PINION)	POLYPHTALAMIDE	Adet	1
14	O-RING (PINION TOP)	NITRILE (NBR 70)	Adet	1
13	BEARING (PINION TOP)	POLYPHTALAMIDE	Adet	1
12	BEARING (PINION BOTTOM)	POLYPHTALAMIDE	Adet	1
11	O-RING (PINION BOTTOM)	NITRILE (NBR 70)	Adet	1
10	COVER BOLT DIN 912 M8X35	STAINLESS STELL	Adet	8
9	O-RING (COVER)	NITRILE (NBR 70)	Adet	2
8	O-RING (PISTON)	NITRILE (NBR 70)	Adet	2
7	BEARING (PISTON SLIDING)	POLYPHTALAMIDE	Adet	2
6	BEARING (PISTON BACK)	POLYPHTALAMIDE	Adet	2
5	PINION	STEEL ALLOY	Adet	1
4	SPRING	HIGH ALLOY SPRING STEEL	Adet	2
3	COVER	CASTING ALUMINIUM	Adet	2
2	PISTON	CASTING ALUMINIUM	Adet	2
1	BODY	CASTING ALUMINIUM ALLOY	Adet	1

Tab 3 Part list of Spring Return Actuators (RA143-RA160-RA200-RA400)

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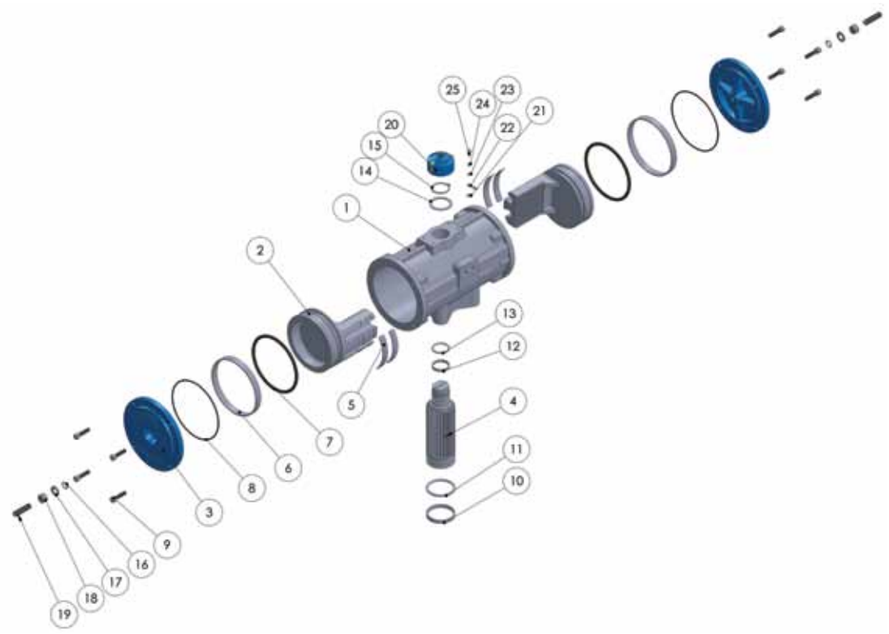

Fig 6 Exploded drawing of Double Acting Actuators (RA143-RA160-RA200-RA400)

No	Part Name	Material	Unit	Quantity
25	BOLT	STAINLESS STEEL	Adet	1
24	SPRING WASHER	STAINLESS STEEL	Adet	1
23	WASHER	STAINLESS STEEL	Adet	1
22	GROUND CONNECTOR	BRASS	Adet	1
21	SERRATED LOCK WASHER	STAINLESS STEEL	Adet	1
20	INDICATOR	ABS	Adet	1
19	O-RING (STOP SET SCREW)	NITRILE (NBR 70)	Adet	2
18	STOP SET SCREW WASHER	STAINLESS STEEL	Adet	2
17	STOP NUT	STAINLESS STEEL	Adet	2
16	STOP SET SCREW	STAINLESS STEEL	Adet	2
15	SPRING CLIP (PINION)	STEEL ALLOY	Adet	1
14	THRUST BEARING (PINION)	POLYPHTALAMIDE	Adet	1
13	O-RING (PINION TOP)	NITRILE (NBR 70)	Adet	1
12	BEARING (PINION TOP)	POLYPHTALAMIDE	Adet	1
11	BEARING (PINION BOTTOM)	POLYPHTALAMIDE	Adet	1
10	O-RING (PINION BOTTOM)	NITRILE (NBR 70)	Adet	1
9	COVER BOLT	STAINLESS STELL	Adet	8
8	O-RİNG (COVER)	NITRILE (NBR 70)	Adet	2
7	O-RING (PISTON)	NITRILE (NBR 70)	Adet	2
6	BEARING (PISTON SLIDING)	POLYPHTALAMIDE	Adet	2
5	BEARING (PISTON BACK)	POLYPHTALAMIDE	Adet	2
4	PINION	STEEL ALLOY	Adet	1
3	COVER	CASTING ALUMINIUM	Adet	2
2	PISTON	CASTING ALUMINIUM	Adet	2
1	BODY	CASTING ALUMINIUM ALLOY	Adet	1

Tab 4 Part list of Double Acting Actuators (RA143-RA160-RA200-RA400)

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d. General Features

- High performance
- High cycle life (1.000.000 operation)
- High torque value
- Standard position indicator
- For quarter turn valve automation (9Nm - 5162Nm)
- One compact design for double and single acting models
- Dual piston rack and pinion
- According to international standards (NAMUR, ISO5211)
- Body: Extruded aluminium
- Piston & Caps: Die cast aluminium
- 90˚ turn, two external travel stop adjustment ±5%
- 100% adjustable travel stop (on request)
- Pressure : Double acting 2.5 bar .... 8 bar
  Single acting 4 bar .... 8 bar
- Temperature : Standard -20˚C ..... 80˚C
  On request -20˚C ..... 150˚C, -30˚C .... 80˚C
- TORK Pneumatic actuators have been manufactured since 1986
- Lubrication : All moving parts are factory lubricated
- On request; exproof model (II 2G EEx c IIB T_4)

Anodized body (standard)

Epoxy coated body

Nickel coated body

PTFE coated body

100% Adjustable
on request

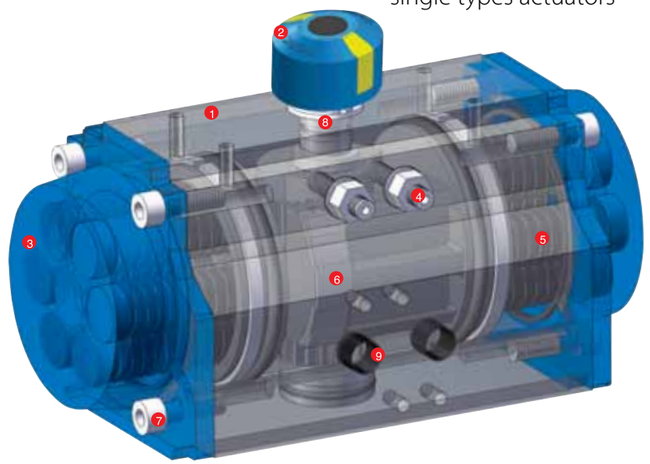
e. Design Features of TORK RA Serie Actuators

1) Actuator Body
Aluminium extruded and honed surface body. Internal and external parts corrosion protected

2) Indicator
It is standard on all actuators, it shows visual position of valve

3) Cover
Provide max. resistance against corrosive elements, same cap design for double and single types actuators

4) Travel Adjustment
Permits adjustment of ± 5% in both directions



5) Springs
Springs provide high performance in safe emergency shutdown operation. Cartridge design & corrosion resistant

6) Bearing & Piston guides
High cycle life,wide operation temperature range,lubricating provide high performance

7) Nuts & Bolts
Stainless steel body. Provide long term corrosion resistance.

8) Piston rack and pinion
Provides wear resistance and protect against corrosion. Die cast pistons anodized aluminium fitted with high quality seals and guides.

9) Connections
- Solenoid valves, switch box, positioners : Namur VDI/VDE 3845
- Bottom valve connection: ISO5211, DIN3337 standard

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f. Techical Specifications

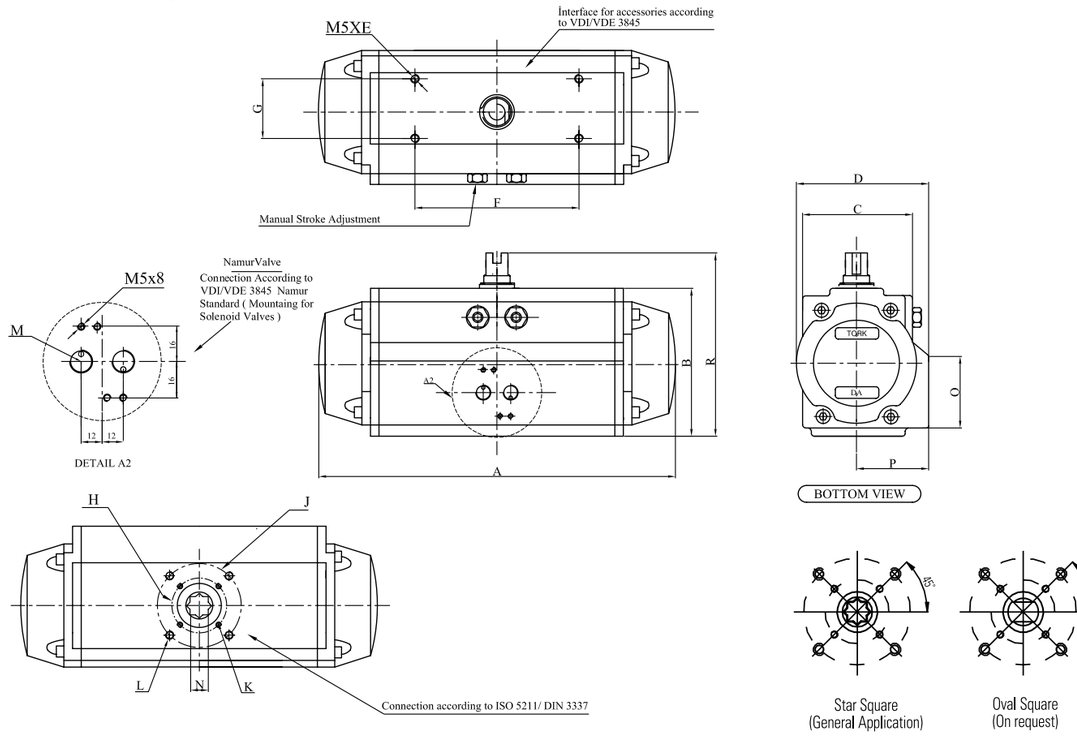
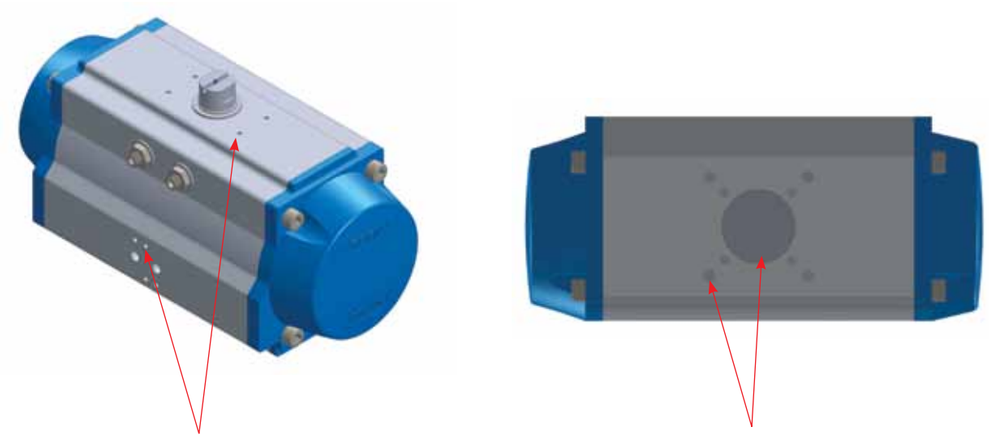


Fig 8 General Dimensions of TORK Actuators



VDI / VDE 3845 (NAMUR)

ISO 5211

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ACTUATOR MODELS	DIMENSIONS (mm)																	
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	ISO Flange for H	ISO Flange for J
RA 32 DA	98	45	46	-	8,0	50	25	36	-	M5	-	1/8"	9	-	-	66	F03	-
RA DA 40	137,2	70,0	52,0	70,6	8,0	80,0	30,0	36/42	-	M5	-	1/8"	9	45,0	39,7	90,0	F03/F04	F05
RA DA 52	172,6	85,2	62,0	82,7	8,0	80,0	30,0	42/50	70,0	M5/M6	M8	1/8"	9/11	47,0	47,0	105,2	F04/F05	F07
RA DA 60	172,6	85,2	62,0	82,7	8,0	80,0	30,0	42/50	70,0	M5/M6	M8	1/8"	9/11	47,0	47,0	105,2	F04/F05	F07
RA DA 75	242,0	116,9	91,8	109,2	8,0	80,0	30,0	50	70,0	M6	M8	1/8"	14	54,8	58,3	136,9	F05	F07
RA DA 80	242,0	116,9	91,8	109,2	8,0	80,0	30,0	50	70,0	M6	M8	1/8"	14	54,8	58,3	136,9	F05	F07
RA DA 100	282,0	130,0	95,0	121,0	8,0	80,0	30,0	70	102,0	M8	M10	1/4"	17	61,0	65,0	160,0	F07	F10
RA DA 120	360,0	160,0	116,2	150,0	8,0	80,0	30,0	70	102,0	M8	M10	1/4"	17/22	82,0	87,2	190,0	F07	F10
RA DA 143	342	190	182	182	8,0	80,0	30,0	102	140	M10	M16	1/4"	22/27	91	91	210	F10	F14
RA DA 160	374	216	202	202	8,0	80,0	30,0	102	140	M10	M16	1/4"	22/27	101	101	236	F10	F14
RA DA 200	458	268	242	242	8,0	80,0	30,0	-	140/165	-	M20	1/4"	36	121	121	288	-	F14/F16
RA DA 350	586,3	440	440	440	8,0	130,0	30,0	-	165	-	M20	1/4"	46	-	-	470	-	F16
RA SR 40	137,2	70,0	52,0	70,6	8,0	80,0	30,0	36/42	-	M5	-	1/8"	9	45,0	39,7	90,0	F03/F04	-
RA SR 52	172,6	85,2	62,0	82,7	8,0	80,0	30,0	42/50	70,0	M5/M6	M8	1/8"	9/11	47,0	47,0	105,2	F04/F05	F07
RA SR 60	172,6	85,2	62,0	82,7	8,0	80,0	30,0	42/50	70,0	M5/M6	M8	1/8"	9/11	47,0	47,0	105,2	F04/F05	F07
RA SR 75	242,0	116,9	91,8	109,2	8,0	80,0	30,0	50	70,0	M6	M8	1/8"	14	54,8	58,3	136,9	F05	F07
RA SR 80	242,0	116,9	91,8	109,2	8,0	80,0	30,0	50	70,0	M6	M8	1/8"	14	54,8	58,3	136,9	F05	F07
RA SR 100	282,0	130,0	95,0	121,0	8,0	80,0	30,0	70	102,0	M8	M10	1/4"	17	61,0	65,0	160,0	F07	F10
RA SR 120	360,0	160,0	116,2	150,0	8,0	80,0	30,0	70	102,0	M8	M10	1/4"	17/22	82,0	87,2	190,0	F07	F10
RA SR 143	514	190	182	182	8,0	80,0	30,0	102	140	M10	M16	1/4"	22/27	91	91	210	F10	F14
RA SR 160	558	216	202	202	8,0	80,0	30,0	102	140	M10	M16	1/4"	22/27	101	101	236	F10	F14
RA SR 200	680	268	242	242	8,0	80,0	30,0	140	140/165	M16	M20	1/4"	36	121	121	288	F14	F14/F16
RA SR 350	866,5	440	-	440	8,0	130	30,0	-	165	-	M20	1/4"	46	-	-	470	-	F16

Tab 6 General Dimensions of TORK Actuators

ACTUATOR MODELS	DIMENSIONS (mm)															
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R
RA 40.2D	143,7	70	52	70,6	8	80	30	36/42/50	-	M5	M6	1/8"	9/11	45	39,7	90
RA 60.2D	197,6	85,2	62	82,7	8	80	30	42/50	70	M5/M6	M8	1/8"	9/11/14	47	47	105,2
RA 80.2D	275	116,9	91,8	109,2	8	80	30	50	70	M6	M8	1/8"	14	54,8	58,3	136,9
RA 100.2D	329	130	95	121	8	80	30	70	102	M8	M10	1/4"	17	61	65	160
RA 120.2D	400	160	116,2	150	8	80	30	70	102	M8	M10	1/4"	17/22	82	87,2	190

Tab 7 General Dimensions of 120° Turn Actuators

ACTUATOR MODELS	DIMENSIONS (mm)															
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R
RA 40.8D	178,2	70	52	70,6	8	80	30	36/42/50	-	M5	M6	1/8"	9/11	45	39,7	90
RA 60.8D	197,6	85,2	62	82,7	8	80	30	42/50	70	M5/M6	M8	1/8"	9/11/14	47	47	105,2
RA 80.8D	333	116,9	91,8	109,2	8	80	30	50	70	M6	M8	1/8"	14	54,8	58,3	136,9
RA 100.8D	402	130	95	121	8	80	30	70	102	M8	M10	1/4"	17	61	65	160
RA 120.8D	481	160	116,2	150	8	80	30	70	102	M8	M10	1/4"	17/22	82	87,2	190

Tab 8 General Dimensions of 180° Turn Actuators

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TORK valve & automation high quality

PNEUMATIC ACTUATORS USER MANUAL

RA SERIES

ACTUATOR MODELS		Air Volume Opening (L)	Air Volume Closing (L)	Opening Time (sec.)	Closing Time (sec.)	Approximate Weigt (kg)
RA 32 DA	DA	0.03	0,02	0,1	0,1	0,4
RA 40 DA/SR	DA	0,09	0,16	0,22	0,26	0,85
	SR			0,26	0,34	1,02
RA 52 DA/SR	DA	0,17	0,28	0,27	0,33	1,70
	SR			0,33	0,38	1,80
RA 60 DA/SR	DA	0,17	0,28	0,27	0,33	1,70
	SR			0,33	0,38	1,80
RA 75 DA/SR	DA	0,50	0,79	0,39	0,48	3,80
	SR			0,48	0,57	4,40
RA 80 DA/SR	DA	0,50	0,79	0,39	0,48	3,80
	SR			0,48	0,57	4,40
RA 100 DA/SR	DA	0,73	1,15	0,52	0,63	4,90
	SR			0,63	0,95	6,10
RA 120 DA/SR	DA	1,61	2,45	0,95	1,15	9,60
	SR			1,15	1,47	11,40
RA 143 DA	DA	2,85	1,95	2,40	2,20	13,00
RA 160 DA	DA	3,25	2,56	2,60	2,30	19,10
RA 200 DA	DA	6,41	5,50	3,40	3,20	33,40
RA 400 DA	DA	12,60	10,80	4,30	3,90	72,00
RA 143 SR	SR	2,85	0	3,20	3,00	17,60
RA 160 SR	SR	3,25	0	3,80	3,50	26,80
RA 200 SR	SR	6,41	0	4,80	4,40	45,90
RA 350 SR	SR	25	0	6,2	5,3	155

Tab 9 Special Dimensions of TORK Actuators

DOUBLE ACTING TORQUE RATING (N.m)

Model	Operating Pressure											
	2,5 bar	3 bar	3,5 bar	4 bar	4,5 bar	5 bar	5,5 bar	6 bar	6,5 bar	7 bar	7,5 bar	8 bar
DA32	2	3	4	5	6	7	8	9	10	11	12	13
DA40	5,5	7,0	8,5	9,9	11,4	12,9	14,4	15,8	17,3	18,8	20,3	21,7
DA52	13,0	16,1	19,3	22,5	25,6	28,8	32,0	35,1	38,3	41,4	44,6	47,8
DA60	14,4	17,9	21,5	25,0	28,5	32,0	35,5	39,0	42,5	46,1	49,6	53,1
DA75	35,7	44,0	52,2	60,4	68,7	76,9	85,1	93,3	101,6	109,8	118,0	126,3
DA80	39,7	48,9	58,0	67,1	76,3	85,4	94,6	103,7	112,9	122,0	131,2	140,3
DA100	65,4	80,1	94,9	109,6	124,4	139,2	153,9	168,7	183,4	198,2	213,0	227,7
DA120	124,9	152,5	180,2	207,9	235,6	263,2	290,9	318,6	346,3	373,9	401,6	429,3
DA143	240,0	288,0	336,0	385,0	433,0	480,0	529,0	578,0	626,0	674,0	722,0	770,0
DA160	321,0	385,0	450,0	510,0	576,0	642,0	705,0	765,0	833,0	897,0	963,0	1024,0
DA200	628,0	752,0	878,0	1000,0	1127,0	1252,0	1377,0	1500,0	1630,0	1752,0	1880,0	2005,0
DA350	2124,0	2558,0	2992,0	3426,0	3860,0	4294,0	4728,0	5162,0	5596,0	6030,0	6464,0	6898,0

Tab 10 Double Acting Actuator Torque Ratings (Nm)

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SPRING RETURN TORQUE RATING (N.m)

Model	Spring Number	Çalıştırma Basıncı																								Spring Torque	
		2,5 bar		3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar		6,5 bar		7 bar		7,5 bar		8 bar			
		0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	90	0°
SR40	S05			4.7	2.2	6.1	3.7	7.6	5.2	9.1	6.6	10.6	8.1	12.0	9.6	13.5	11.1	15.0	12.5	16.5	14.0	17.9	15.5	19.4	17.0	2.9	0.4
	S06					5.7	2.7	7.1	4.2	8.6	5.7	10.1	7.2	11.6	8.6	13.1	10.1	14.5	11.6	16.0	13.1	17.5	14.5	19.0	16.0	3.8	0.9
	S07							6.7	3.3	8.2	4.7	9.6	6.2	11.1	7.7	12.6	9.2	14.1	10.6	15.5	12.1	17.0	13.6	18.5	15.1	4.8	1.4
	S08							6.2	2.3	7.7	3.8	9.2	5.3	10.6	6.7	12.1	8.2	13.6	9.7	15.1	11.2	16.6	12.6	18.0	14.1	5.7	1.8
	S09									7.2	2.8	8.7	4.3	10.2	5.8	11.7	7.3	13.1	8.7	14.6	10.2	16.1	11.7	17.6	13.2	6.7	2.3
	S10											8.2	3.4	9.7	4.8	11.2	6.3	12.7	7.8	14.1	9.3	15.6	10.7	17.1	12.2	7.6	2.8
	S11											7.8	2.4	9.3	3.9	10.7	5.4	12.2	6.8	13.7	8.3	15.2	9.8	16.6	11.3	8.6	3.2
	S12													8.8	2.9	10.3	4.4	11.7	5.9	13.2	7.4	14.7	8.8	16.2	10.3	9.5	3.7
SR52	S05			11.1	5.5	14.3	8.7	17.4	11.9	20.6	15.0	23.8	18.2	26.9	21.4	30.1	24.5	33.2	27.7	36.4	30.8	39.6	34.0	42.7	37.2	7.8	2.2
	S06					13.3	6.6	16.4	9.7	19.6	12.9	22.8	16.1	25.9	19.2	29.1	22.4	32.2	25.6	35.4	28.7	38.6	31.9	41.7	35.0	9.9	3.2
	S07					12.3	4.5	15.4	7.6	18.6	10.8	21.7	13.9	24.9	17.1	28.1	20.3	31.2	23.4	34.4	26.6	37.6	29.8	40.7	32.9	12.0	4.2
	S08							14.4	5.5	17.6	8.7	20.7	11.8	23.9	15.0	27.1	18.1	30.2	21.3	33.4	24.5	36.6	27.6	39.7	30.8	14.1	5.2
	S09									16.6	6.5	19.7	9.7	22.9	12.9	26.1	16.0	29.2	19.2	32.4	22.4	35.5	25.5	38.7	28.7	16.3	6.2
	S10									15.6	4.4	18.7	7.6	21.9	10.7	25.0	13.9	28.2	17.1	31.4	20.2	34.5	23.4	37.7	26.6	18.4	7.2
	S11											17.7	5.5	20.9	8.6	24.0	11.8	27.2	14.9	30.4	18.1	33.5	21.3	36.7	24.4	20.5	8.2
	S12													19.9	6.5	23.0	9.7	26.2	12.8	29.4	16.0	32.5	19.2	35.7	22.3	22.6	9.2
SR60	S05			12.3	6.1	15.9	9.7	19.4	13.2	22.9	16.7	26.4	20.2	29.9	23.7	33.4	27.2	36.9	30.8	40.5	34.3	44.0	37.8	47.5	41.3	8.6	2.4
	S06					14.7	7.3	18.2	10.8	21.8	14.3	25.3	17.9	28.8	21.4	32.3	24.9	35.8	28.4	39.3	31.9	42.9	35.4	46.4	38.9	11.0	3.6
	S07					13.6	4.9	17.1	8.5	20.6	12.0	24.2	15.5	27.7	19.0	31.2	22.5	34.7	26.0	38.2	29.6	41.7	33.1	45.2	36.6	13.3	4.7
	S08							16.0	6.1	19.5	9.6	23.0	13.1	26.6	16.7	30.1	20.2	33.6	23.7	37.1	27.2	40.6	30.7	44.1	34.2	15.7	5.8
	S09									18.4	7.3	21.9	10.8	25.4	14.3	29.0	17.8	32.5	21.3	36.0	24.8	39.5	28.4	43.0	31.9	18.1	6.9
	S10									17.3	4.9	20.8	8.4	24.3	11.9	27.8	15.5	31.3	19.0	34.9	22.5	38.4	26.0	41.9	29.5	20.4	8.0
	S11											19.7	6.1	23.2	9.6	26.7	13.1	30.2	16.6	33.7	20.1	37.3	23.6	40.8	27.2	22.8	9.2
	S12													22.1	7.2	25.6	10.7	29.1	14.3	32.6	17.8	36.1	21.3	39.7	24.8	25.1	10.3
SR75	S05	22.0	9.3	30.2	17.5	38.5	25.7	46.7	34.0	54.9	42.2	63.2	50.4	71.4	58.6	79.6	66.9	87.9	75.1	96.1	83.3	104.3	91.6	112.5	99.8	20.7	8.1
	S06					35.7	20.4	44.0	28.7	52.2	36.9	60.4	45.1	68.7	53.3	76.9	61.6	85.1	69.8	93.3	78.0	101.6	86.3	109.8	94.5	26.1	10.8
	S07					33.0	15.1	41.2	23.4	49.4	31.6	57.7	39.8	65.9	48.1	74.1	56.3	82.4	64.5	90.6	72.7	98.8	81.0	107.1	89.2	31.5	13.5
	S08							38.5	18.1	46.7	26.3	54.9	34.5	63.2	42.8	71.4	51.0	79.6	59.2	87.9	67.4	96.1	75.7	104.3	83.9	36.9	16.2
	S09									44.0	21.0	52.2	29.2	60.4	37.5	68.7	45.7	76.9	53.9	85.1	62.2	93.3	70.4	101.6	78.6	42.3	18.9
	S10									41.2	15.7	49.4	23.9	57.7	32.2	65.9	40.4	74.1	48.6	82.4	56.9	90.6	65.1	98.8	73.3	47.7	21.6
	S11											46.7	18.6	54.9	26.9	63.2	35.1	71.4	43.3	79.6	51.6	87.9	59.8	96.1	68.0	53.1	25.2
	S12											44.0	13.3	52.2	21.6	60.4	29.8	68.6	38.0	76.9	46.3	85.1	54.5	93.3	62.7	58.5	27.9
SR80	S05	24.5	10.3	33.6	19.4	42.8	28.6	51.9	37.7	61.0	46.9	70.2	56.0	79.3	65.2	88.5	74.3	97.6	83.4	106.8	92.6	115.9	101.7	125.1	110.9	23.0	9.0
	S06					39.7	22.7	48.8	31.8	58.0	41.0	67.1	50.1	76.3	59.3	85.4	68.4	94.6	77.6	103.7	86.7	112.9	95.9	122.0	105.0	29.0	12.0
	S07					36.7	16.8	45.8	26.0	54.9	35.1	64.1	44.2	73.2	53.4	82.4	62.5	91.5	71.7	100.7	80.8	109.8	90.0	119.0	99.1	35.0	15.0
	S08							42.7	20.1	51.9	29.2	61.0	38.4	70.2	47.5	79.3	56.7	88.5	65.8	97.6	74.9	106.8	84.1	115.9	93.2	41.0	18.0
	S09									48.8	23.3	58.0	32.5	67.1	41.6	76.3	50.8	85.4	59.9	94.6	69.1	103.7	78.2	112.9	87.3	47.0	21.0
	S10									45.8	17.5	54.9	26.6	64.1	35.7	73.2	44.9	82.4	54.0	91.5	63.2	100.7	72.3	109.8	81.5	53.0	24.0
	S11											51.9	20.7	61.0	29.9	70.2	39.0	79.3	48.1	88.5	57.3	97.6	66.4	106.8	75.6	59.0	28.0
	S12											48.8	14.8	58.0	24.0	67.1	33.1	76.3	42.3	85.4	51.4	94.6	60.6	103.7	69.7	65.0	31.0
SR100	S05	41.4	24.0	56.2	38.8	70.9	53.5	85.7	68.3	100.4	83.0	115.2	97.8	130.0	112.6	144.7	127.3	159.5	142.1	174.2	156.8	189.0	171.6	203.8	186.4	32.9	15.5
	S06			51.4	30.5	66.1	45.2	80.9	60.0	95.7	74.8	110.4	89.5	125.2	104.3	139.9	119.1	154.7	133.8	169.5	148.6	184.2	163.3	199.0	178.1	41.2	20.3
	S07			46.6	22.2	61.3	37.0	76.1	51.7	90.9	66.5	105.6	81.3	120.4	96.0	135.1	110.8	149.9	125.5	164.7	140.3	179.4	155.1	194.2	169.8	49.4	25.1
	S08					56.6	28.7	71.3	43.5	86.1	58.2	100.8	73.0	115.6	87.8	130.4	102.5	145.1	117.3	159.9	132.0	174.6	146.8	189.4	161.6	57.7	29.9
	S09					51.8	20.4	66.5	35.2	81.3	50.0	96.0	64.7	110.8	79.5	125.6	94.2	140.3	109.0	155.1	123.8	169.8	138.5	184.6	153.3	66.0	34.6
	S10							61.7	26.9	76.5	41.7	91.3	56.5	106.0	71.2	120.8	86.0	135.5	100.7	150.3	115.5	165.1	130.3	179.8	145.0	74.2	39.4
	S11									71.7	33.4	86.5	48.2	101.2	62.9	116.0	77.7	130.7	92.5	145.5	107.2	160.3	122.0	175.0	136.7	82.5	44.2
	S12									66.9	25.2	81.7	39.9	96.4	54.7	111.2	69.4	126.0	84.2	140.7	99.0	155.5	113.7	170.2	128.5	90.8	49.0
SR120	S05	83.1	55.1	110.7	82.7	138.4	110.4	166.1	138.1	193.8	165.8	221.4	193.4	249.1	221.1	276.8	248.8	304.5	276.5	332.2	304.1	359.8	331.8	387.5	359.5	56.3	28.3
	S06	74.7	41.1	102.4	68.8	130.1	96.5	157.7	124.1	185.4	151.8	213.1	179.5	240.8	207.2	268.4	234.8	296.1	262.5	323.8	290.2	351.5	317.9	379.1	345.5	70.2	36.6
	S07			94.0	54.8	121.7	82.5	149.4	110.2	177.1	137.9	204.7	165.5	232.4	193.2	260.1	220.9	287.8	248.6	315.4	276.2	343.1	303.9	370.8	331.6	84.2	45.0
	S08			85.7	40.9	113.3	68.5	141.0	96.2	168.7	123.9	196.4	151.6	224.1	179.2	251.7	206.9	279.4	234.6	307.1	262.3	334.8	290.0	362.4	317.6	98.1	53.3
	S09					105.0	54.6	132.7	82.3	160.3	109.9	188.0	137.6	215.7	165.3	243.4	193.0	271.0	220.6	298.7	248.3	326.4	276.0	354.1	303.7	112.1	61.7
	S10					96.6	40.6	124.3	68.3	152.0	96.0	179.7	123.7	207.3	151.3	235.0	179.0	262.7	206.7	290.4	234.4	318.0	262.0	345.7	289.7	126.0	70.0
	S11							116.0	54.3	143.6	82.0	171.3	109.7	199.0	137.4	226.7	165.1	254.3	192.7	282.0	220.4	309.7	248.1	337.4	275.8	140.0	78.4
	S12							107.6	40.4	135.3	68.1	162.9	95.7	190.6	123.4	218.3	151.1	246.0	178.8	273.7	206.4	301.3	234.1	329.0	261.8	154.0	86.8
SR143	S02							169.5	37.3	217.5	85.3	264.5	132.3	313.5	181.3	362.5	230.3	410.5	275.3	458.5	326.3	506.5	374.3	554.5	422.3	215.5	347.7
SR160	S02							226.7	50.7	292.7	116.7	358.7	182.7	421.7	245.7	481.7	305.7	549.7	373.7	613.7	437.7	679.7	503.7	740.7	564.7	283.3	459.3
SR200	S02							336.7	107.8	463.7	234.8	588.7	359.8	713.7	484.8	836.7	607.8	966.7	737.8	1088.7	859.8	1216.7	987.8	1341.7	1112.8	663.3	892.2
SR350	S02							1385.6	207.2	1819.6	641.2	2253.5	1075.1	2687.5	1509.1	3121.4	1943.1	3555.4	2377.0	3989.4	2811.0	4423.3	3245.0	4857.3	3678.9	3129.2	1950.0

Tab 11 Spring Return Actuator Torque Ratings (Nm)

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TORK valve & automation high quality

PNEUMATIC ACTUATORS
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RA
SERIES

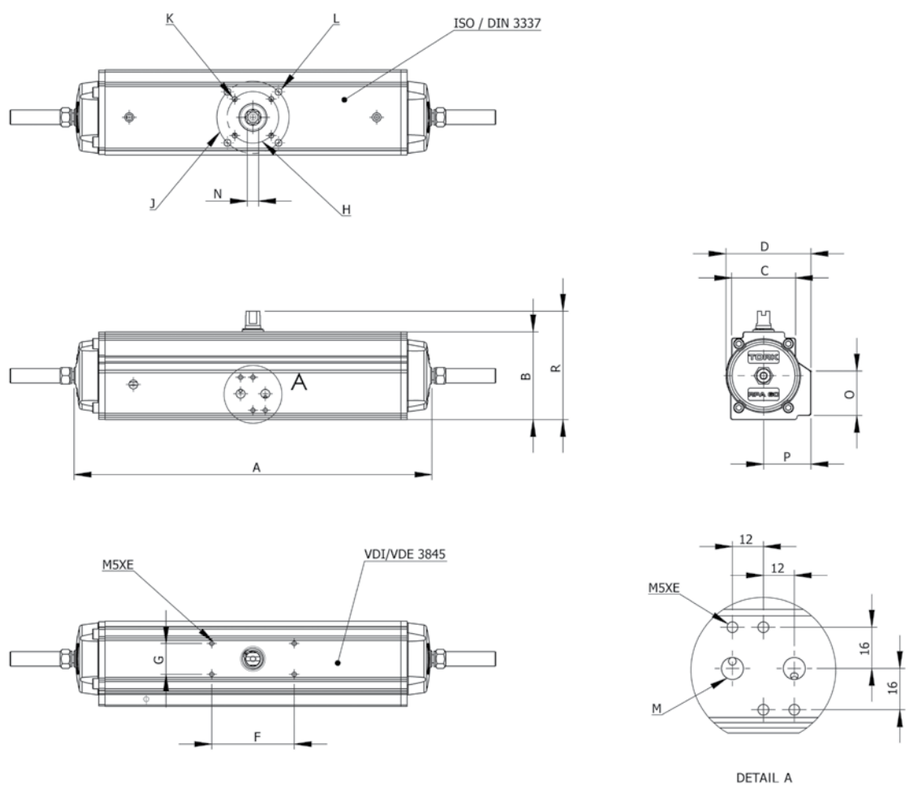

Fig 9 General Dimensions of 3 Position Actuators

Type/Order Number	P:6 bar Torque	Dimensions (mm)																ISO 5211 Flange
RA	Nm	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	
RA 40.3P	15,8	213	70	52	70,6	8	80	30	36/42/50	-	M5	M6	1/8"	9/11	45	40	90	F03/F04/F05
RA 60.3P	39	263	85,2	62	82,7	8	80	30	42/50	70	M5/M6	M8	1/8"	9/11/14	47	47	105	F04/F05/F07
RA 80.3P	94,6	346	116,9	91,8	109,2	8	80	30	50	70	M6	M8	1/8"	14	54,8	58,3	136,9	F05/F07
RA 100.3P	168,7	405,7	130	95	121	8	80	30	70	102	M8	M10	1/4"	17	61	65	160	F07
RA 120.3P	318,6	472,2	160	116,2	150	8	80	30	70	102	M8	M10	1/4"	17/22	82	87,2	190	F07

Tab 12 General Dimensions of 3 Position Actuators

Type/Order Number	P:6 bar Torque	Dimensions (mm)																ISO 5211 Flange
RA	Nm	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	
RA 40.8P	15,8	263	70	52	70,6	8	80	30	36/42/50	-	M5	M6	1/8"	9/11	45	40	90	F03/F04/F05
RA 60.8P	39	347	85,2	62	82,7	8	80	30	42/50	70	M5/M6	M8	1/8"	9/11/14	47	47	105	F04/F05/F07
RA 80.8P	94,6	458,5	116,9	91,8	109,2	8	80	30	50	70	M6	M8	1/8"	14	54,8	58,3	136,9	F05/F07

Tab 13 General Dimensions of 3 Position 180° Actuators

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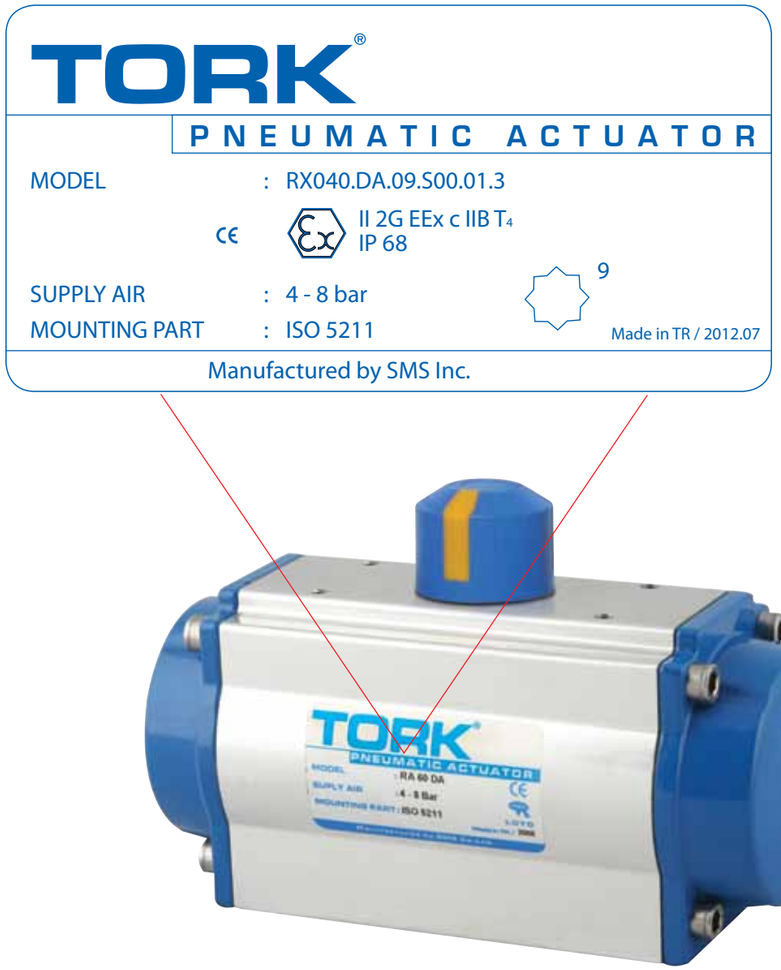
e. Warning Signs and Labeling



Pneumatic connections should be disconnected before any intervention.

Refer to the instruction manual before any intervention.

As pneumatic actuator can be used efficiently after 500.000 unpacking and packing, oring kits of product should be replaced.

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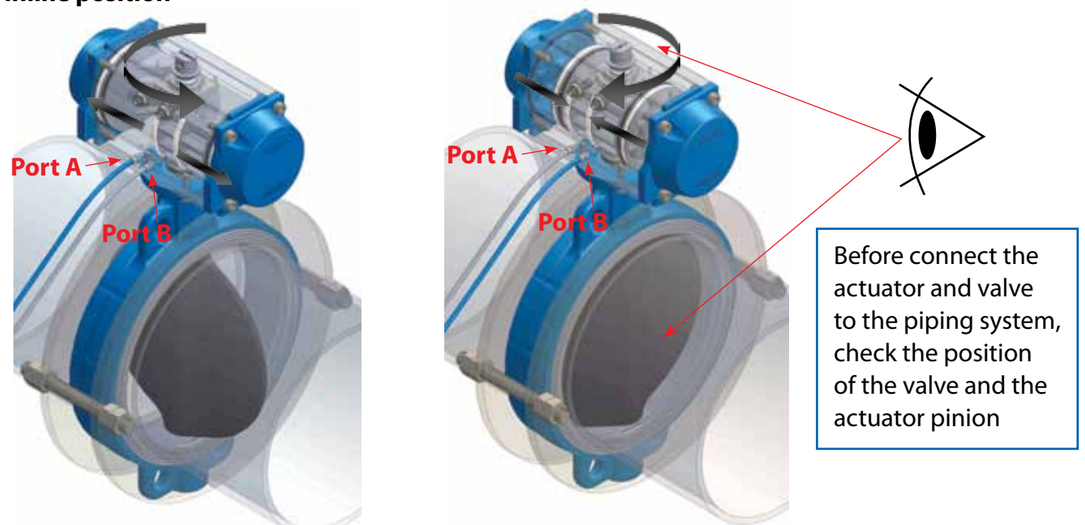
2. OPERATION OF THE EQUIPMENT

a. Operation of Double Acting Actuators

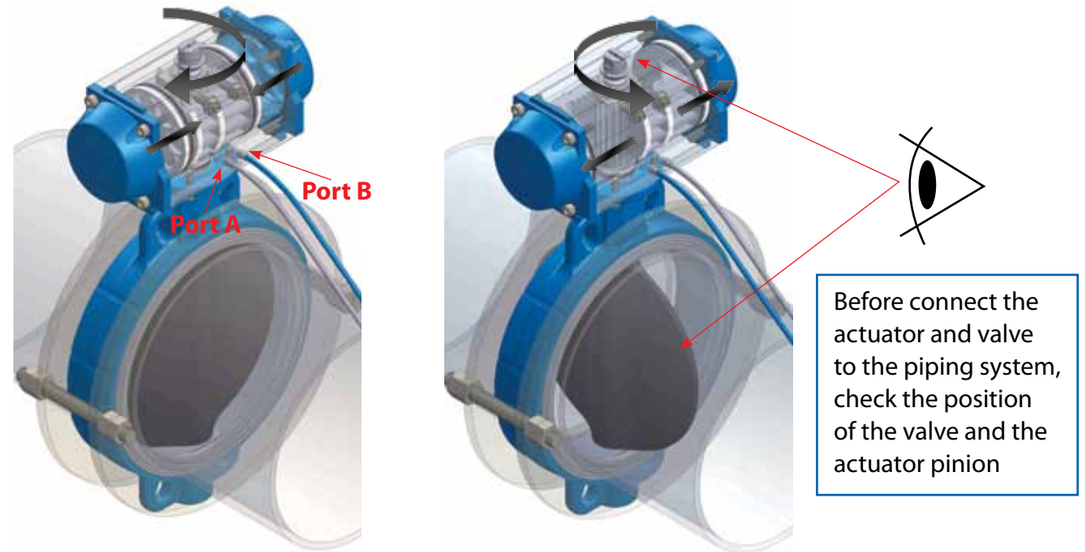
Inline position



Before connect the actuator and valve to the piping system, check the position of the valve and the actuator pinion

Port A : Pressurized to open the valve. Actuator rotates CCW for opening.
Port B : Pressurized for close the valve. Actuator rotates CW for closing.

Across position



Before connect the actuator and valve to the piping system, check the position of the valve and the actuator pinion

Port A : Pressurized to open the valve. Actuator rotates CCW for opening.
Port B : Pressurized for close the valve. Actuator rotates CW for closing.

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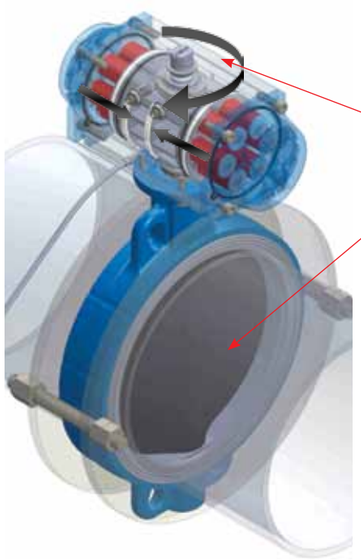
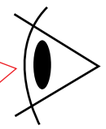
b. Operation of Spring Return Actuators

Inline position

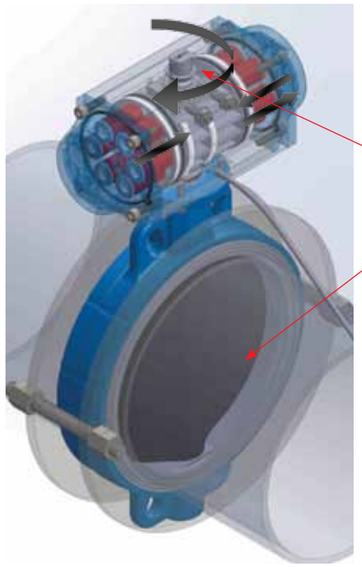


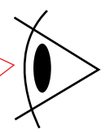


Before connect the actuator and valve to the piping system, check the position of the valve and the actuator pinion

Port A : Pressurized to open the valve. Actuator rotates CCW for opening.
Port A : Non-Pressurized and springs made their jobs for closing the valve. Actuator rotates CW for closing.

Across position





Before connect the actuator and valve to the piping system, check the position of the valve and the actuator pinion

Port A : Pressurized to open the valve. Actuator rotates CCW for opening.

Port A : Non-Pressurized and springs made their jobs for closing the valve. Actuator rotates CW for closing.

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c. Operation of 3 Position Actuator

In order to operate the 3 position actuator, can be benefited from the 3/2 solenoid valve. (Figure 10)

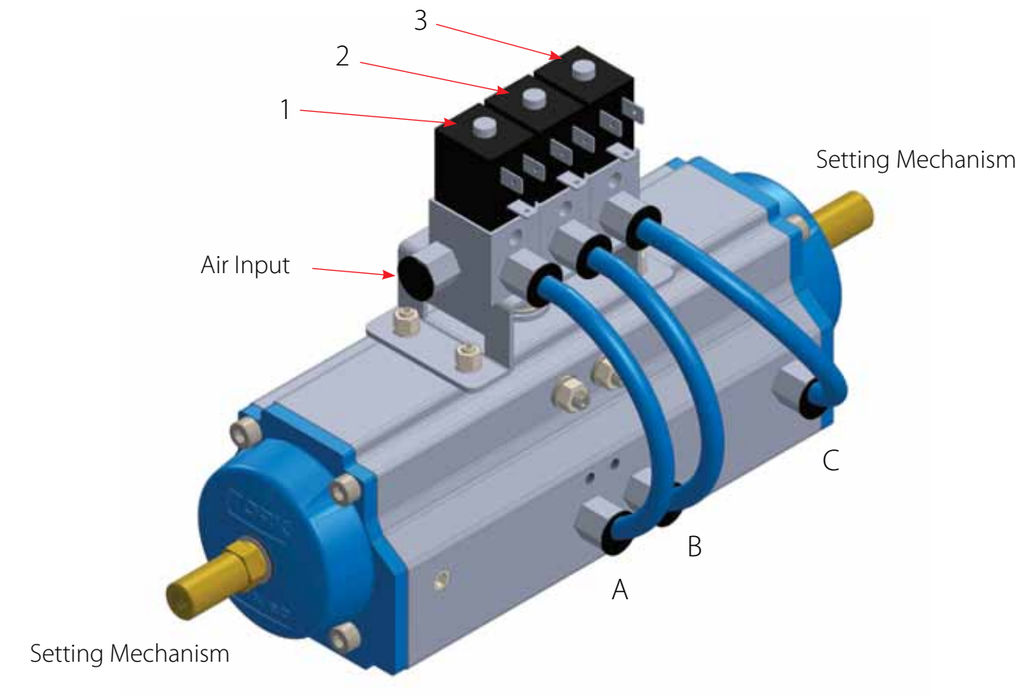

Fig. 10.3 position actuator

a) Mounting: Fortriple 3/2 solenoid valve; the valve with number 1 should be connected to A port, the valve with number 2 to B port and the valve with number 3 to C port.

b) Operating:

1) Pressure air is given to air input port.

2) The coil with number 1 is powered. In this way, the actuator turns 90°and switches to fully open position.

3) The coil with number 3 is powered and the power of coil with number 1 is shut off. In this way actuator is half closed. Half closed position can be regulated between 30-60°.

4) The coil with number 2 is powered and the power of coil with number 3 is shut off. In this way actuator is fully closed.

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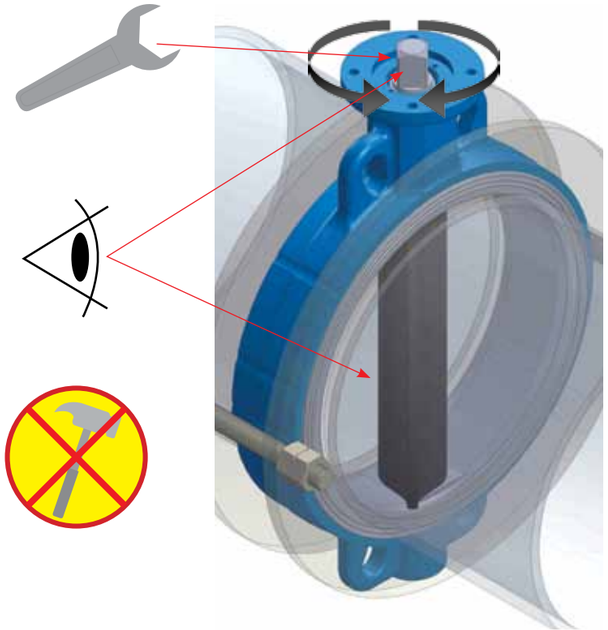
3. INSTALLATION OF THE EQUIPMENT

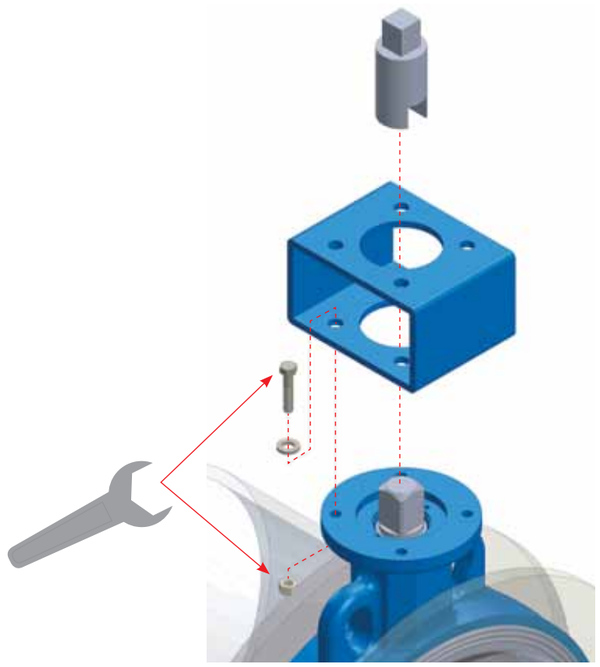
a. Mounting the Actuator to Valve Assembly

I. Adjust the valve to closed position by usinga wrench.

II. Do not use hammer for adjusting the valve shaft.



III. Mount the bracket on valve by using screws and nuts like in the picture. Place the extension on valve piniondirectly.



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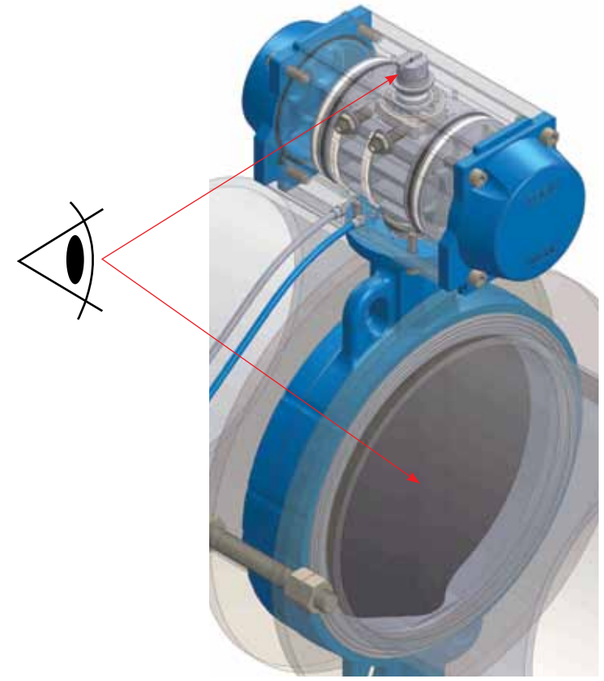
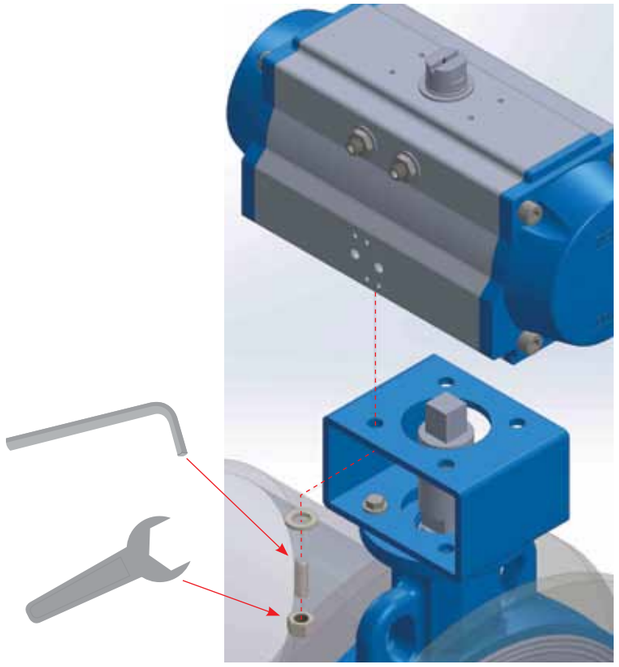
IV. When mounting the actuator pay attention to open and close position of valve.

Before connect the actuator and valve to the piping system, check the position of the valve and the actuator pinion



V. Mount the actuator to the valve with set screw and nut by suitable tools.



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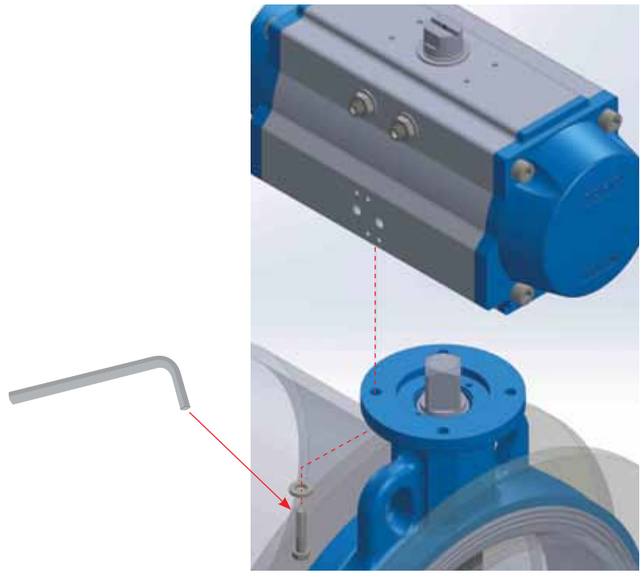
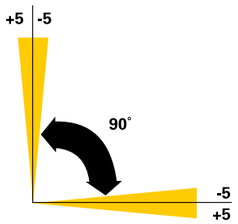
VI. Mount the actuator to the valve with screw by suitable tools.



b. Stroke Adjustment

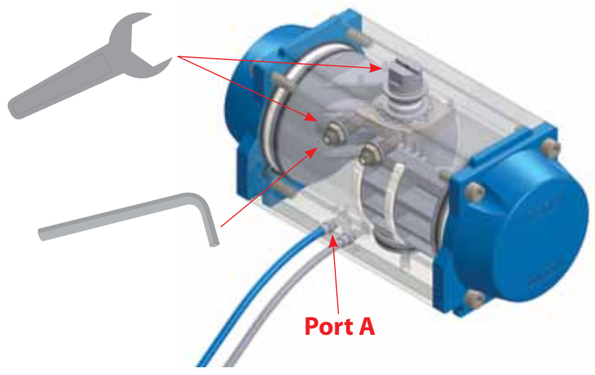


Double Acting Actuators (Open Position)

I. Connect the actuator to pressurized air system. Give some pressure to "Port A" to open the actuator.

II. Adjust the pistons to accurate position by using wrench.

III. Turn the left set screw until an obstruction is felt. Do not turn anymore and do not force it. For lock the set screw use lock nut.

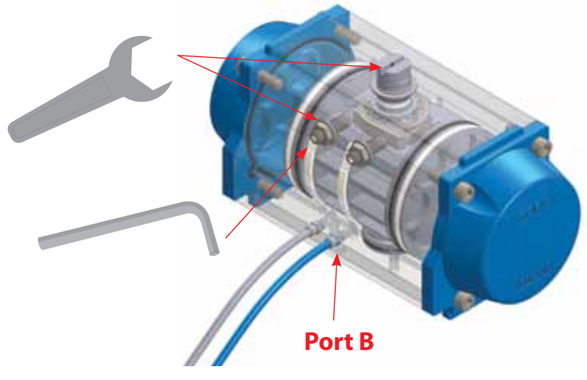


Double Acting Actuators (Close Position)

I. Connect the actuator to pressurized air system. Give some pressure to "Port B" to close the actuator.

II. Adjust the pistons to accurate position by using wrench.

III. Turn the right set screw until an obstruction is felt. Do not turn anymore and do not force it. For lock the set screw use lock nut.



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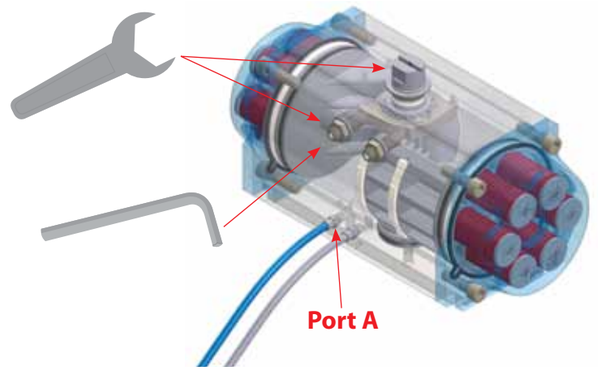
Spring Return Actuators (Open Position)

I. Connect the actuator to pressurized air system. Give some pressure to "Port A" to open the actuator.

II. Adjust the pistons to accurate position by using wrench.

III. Turn the left set screw until an obstruction is felt. Do not turn anymore and do not force it. For lock the set screw use lock nut.

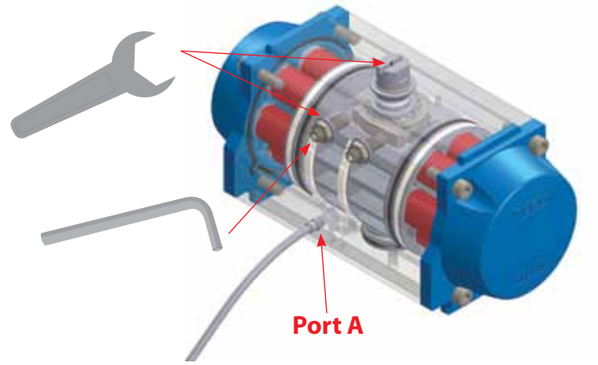


Spring Return Actuators (Close Position)

I. Release the pressure in "Port A". Springs wouldclose the actuator.

II. Adjust the pistons to accurate position by using wrench.

III. Turn the right set screw until an obstruction is felt. Do not turn anymore and do not force it. For lock the set screw use lock nut.



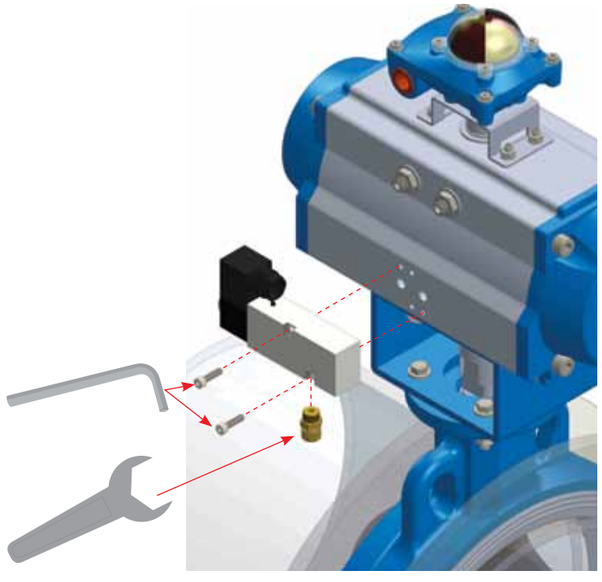
c. Mounting the Namur Solenoid to Actuator Assembly

I. Mount the solenoid to the actuator with socket head screw by suitable tools.

NOTE: To prevent the "water hammer" connect the throttle valve(s) to the namur solenoid exhaust(s) with suitable tool and sealing. "Pressurized air discharge time can be adjusted with throttle valve (s) thus the valves Opening or Closing speed adjusted too." For this optional throttle valve, you should inform us when ordering the pneumatic actuator.

⚠ Pneumatic connections should be disconnected before any intervention.

⚠ For protection against potentially explosive atmospheres use certified ex proof Namur solenoid valves and "RX" code ex proof pneumatic actuators.



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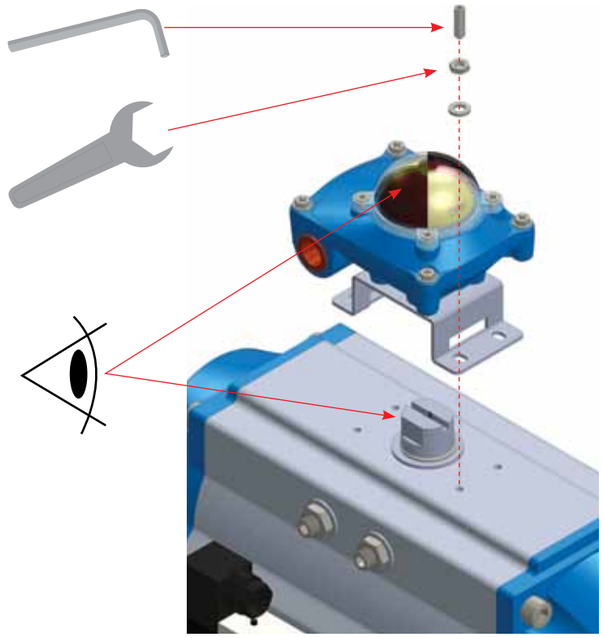
d. Mounting the Switch Box to Actuator Assembly

I. Mount the switch box to the actuator with set screw and nut by suitable tools.

Before connect the actuator and switch box, check the position of the switch box and the actuator pinion



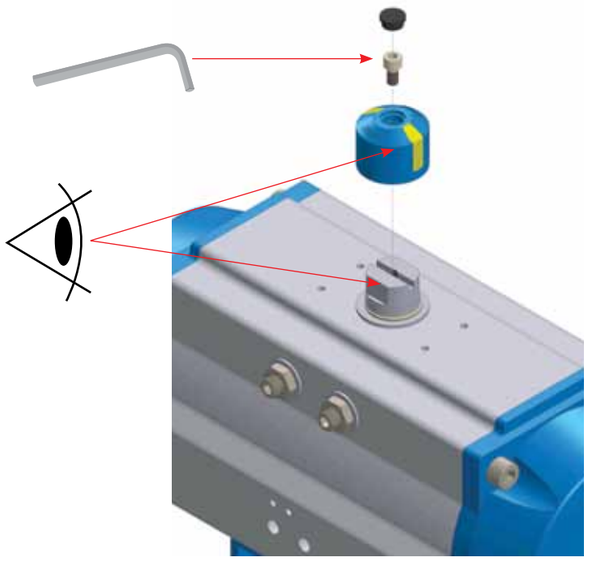
⚠ Pneumatic connections should be disconnected before any intervention.

⚠ For protection against potentially explosive atmospheres use certified ex proof switch box and "RX" code ex proof pneumatic actuators.

e. Mounting the Position Indicator to Actuator Assembly

I. Mount the position indicator to the actuator with flat screw by suitable tool.

Before connect the actuator and switch box, check the position of the switch box and the actuator pinion



⚠ Pneumatic connections should be disconnected before any intervention.

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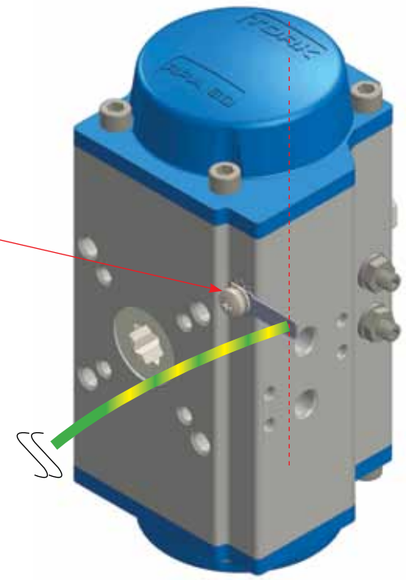
f. Ground Connection

In exproof models mount the main supply ground cable socket (color code is yellow green) to the ground connector on the pneumatic actuator.



g. Actuator Supply Condition

⚠ Before connect the air system to actuator, use air filter, pressure, and oiler. For the accurate operation temperature and pressure ranges are listed below. Responsibility for supply condition belonged to the user. For any damage on or in the pneumatic actuator cause of different supply condition listed below, company has no responsibility. Service actions would be taken with a fee.

PRESSURE (bar)	
Double Acting	2,5 bar …. 8 bar
Single Acting	4 bar …. 8 bar
TEMPERATURE (°C)	
Standard	-20°C …. 80°C
On Request	-20°C …. 150°C or -30°C …. 80°C

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WARRANTY CONDITIONS

1. If there is a fault caused by the production, the manufacturer will repair or replace the defective product in its sole discretion.
2. The warranty period is two (2) years and starts from the date of delivery of the product to consumers.
3. All products, including all sub-parts, covered by our warranty.
4. The maximum repair time is one (1) month and starts from the products' arrival date to SMS factory.
5. Within the warranty period, both in material and workmanship, as well as in case of manufacturing defects, products will be repaired without any charge under any name (labor costs, or the cost of replaced parts).
6. During the warranty period, provided that the products will be exchanged free of charge if the fault is sourced by production.
7. Damages caused by the using of the product contrary to the points listed in the operating instructions are excluded from warranty coverage.
8. If there are complaints about the product please contact customer relations manager firstly.
9. For return or repair-maintenance of products send them to the factory to the customer relations department.
10. If products come to the factory, it doesn't mean acceptance of return and received by officers. Returns accepted, with the approval of the examination will be only after the relevant department managers.
11. Consult to General Directorate of Consumer and Competition Protection of the Ministry Industry and Commerce of Turkey about the issues may arise with warranty certificate.

EXCLUSIONS OF WARRANTY (USAGE DEFECTS)

1. Malfunctions occurring after the expiration of the statutory warranty,
2. The faults caused by improper use of the product by the user, (improper using to the instruction manual),
3. Any relevant malfunctions caused by other equipment in use,
4. Changes and damages not caused by the product manufacturer; for example, the case of the opening of the product by not authorized workshops,
5. All failures depend on the system (electricity, air, etc),
6. Failures depend on the intervention of unauthorized service,
7. Products with damaged or destroyed warranty label,
8. In case of damage to outer surface of the product,
9. The faults in the caused by falling, hit, etc,
10. Faults occurred on dusty, damp, extreme heat or cold environments,
11. Faults caused by natural disasters such as flood, fire, earthquake, lightning, etc,
12. Faults caused by electrostatic discharge (ESD) damage.

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WARRANTY CERTIFICATE

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Plant: İMES OSB. 5. Cadde No: 6 Çerkeşli OSB Mah. Dilovası Kocaeli TURKEY
Tel: +90 262 290 20 20 Fax: +90 262 290 20 21

Product : PNEUMATIC ACTUATORS

Trade Mark : TORK

Model : .....

Serial Number : .....

Delivery Place & Date : .....

Warranty Period : 2 Years

Max. Repair Time : 20 working days

Seller / Distributor : .....

Address : .....
.....
.....
.....

Manufacturer Representative
Name / Surname: Emre UZUN
Title: Quality Manager
Date: 23.12.2013
Signature:

Seller / Distrubutor Representative
Name / Surname:
Title:
Date:
Signature:

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